9 Transport and Access

9.1 Introduction

9.1.1 This ES chapter was prepared by KMC Transport Planning Ltd (KMC) and presents an assessment of the likely significant effects of the Proposed Development on transport and access. Mitigation measures are identified, where appropriate, to avoid, reduce or offset any significant adverse effects identified and/or enhance likely beneficial effects. The nature and significance of the likely residual effects are reported.

9.1.2 The chapter is supported by the following appendices:

- Appendix 9.1: Transport Assessment (TA);
- Appendix 9.2: Framework Site-wide Travel Plan (FTP);
- Appendix 9.3: Framework Construction Traffic Management Plan (CTMP);
- Appendix 9.4: Framework Delivery, Servicing and Management Plan (DSMP);
- Appendix 9.5: Link diagram and sensitivity receptors;
- Appendix 9.6: Construction assessment;
- Appendix 9.7: Completed Development assessment; and
- Appendix 9.8: Cumulative assessment.

Competence

9.1.3 This assessment has been overseen and approved by Kirsty McMullen. Kirsty has an MEng in Civil Engineering and has over 20 years of experience working within the transport planning industry. Kirsty has led the transport support to planning applications for a number of major developments, including the preparation of transport ES chapters and Transport Assessments.

9.1.4 This chapter has been prepared by Stuart Morse. Stuart is a Director at KMC Transport Planning Ltd with over 20 years of experience in highways and transportation. Stuart has a BSc (Hons) in Geography and a MSc in Transport Planning and Management and has undertaken many Transport Assessments and prepared associated ES inputs for numerous schemes in the retail, residential and commercial sectors, including for developments similar in nature, size, and scale to the Proposed Development.

9.2 Legislation, Planning Policy, and Guidance

Legislation Context

9.2.1 There is no international or national legislation deemed relevant to the environmental assessment of transport effects.

Planning Policy Context

9.2.2 The following national, regional and local planning policy is relevant to the Proposed Development and a full detailed policy review can be found in Chapter 4 of the Transport Assessment:

National

- National Planning Policy Framework (2021)[1]

Regional

- Oxfordshire Local Transport and Connectivity Plan (2022) (key policies listed below)[2]:
    - Policy 1 Transport User Hierarchy;
    - Policy 2 Cycling and Walking Networks;
    - Policy 5 Public Rights of Way;
    - Policy 10 Safe Streets; and
    - Policy 31 Network Management.

Local

- Cherwell Local Plan (Part 1) (2020) Partial Review – Oxford's Unmet Housing Need ('Local Plan') (key transport related policies listed below)[3]:
    - Policy PR4a Sustainable Transport;
    - Policy PR4b Kidlington Centre;
    - Policy PR5 Green Infrastructure;
    - Policy PR8 Land East of the A44; and
    - Policy PR11 Infrastructure Provision.
- Cherwell Local Plan 2011-2031 (Part 1) (2015) (key transport related policies listed below)[4]:
    - Policy PSD 1 Presumption in Favour of Sustainable Development; and
    - Policy SLE 4 Improved Transport and Connection.
- Cherwell Local Plan 1996 Saved Policies (key transport related policies listed below):
    - Policy TR1 Transportation Funding;
    - Policy TR7 Development Attracting Traffic on Minor Roads.

Guidance

9.2.3 The following guidance is relevant to the Proposed Development:

- Guidelines for the Environmental Assessment of Road Traffic[1] (IEMA) ('IEMA Guidelines')[5];
- Design Manual for Roads and Bridges LA 104 - Environmental assessment and monitoring (Revision 1)[6];
- Local Transport Note (LTN) 1/20 Cycle infrastructure design (2020)[7];
- Active Design Guidance (Active Travel England) (2023)[8];
- Oxfordshire County Council Implementing Decide and Provide (2022);
- Oxfordshire County Council Parking Standards for New Developments (2022)[9]; and

[1] NB. new guidance on 'Environmental Assessment of Traffic and Movement' was published by IEMA in July 2023 and replaces the IEMA 1993 guidance. At the time of preparing the ES chapter the July 2023 IEMA guidance was not available and therefore this assessment is based on the IEMA 1993 guidance

- Oxfordshire County Council Street Design Guide (2021)[10].

9.3 Assessment Methodology

Consultation

Pre-Application Consultation

9.3.1 The transport aspects of the Proposed Development have been subject to comprehensive pre-application discussions with Cherwell District Council (CDC), as the local planning authority and Oxfordshire County Council (OCC), as the local highway authority (LHA). Transport related comments arising from the pre-application engagement have informed the design of the Proposed Development and traffic modelling which in turn informed this ES transport chapter and the Transport Assessment (TA).

9.3.2 Table 9.1 summarises key comments raised by consultees of relevance to this assessment during pre-application meetings and/or communication exchanges and how the assessment has responded to them.

Table 9.1: Consultation Response Summary

Consultee and Comment	Response
Oxfordshire County Council (ongoing between January 2022 and July 2023)	
A number of meetings have been held with OCC, as the LHA, to agree the scope of the transport assessment as follows: ▪ Study area; ▪ Transport model to be used; ▪ Committed development to be included within the assessment and approach to traffic growth; ▪ Transport infrastructure to be included within the traffic model; ▪ PR site trip generation. OCC audited the traffic modelling in January 2023 as part of the application. Corresponding model updates were made in response to this.	Response not required as the traffic modelling undertaken to inform the TA has been undertaken in line with the study area and other parameters agreed with OCC. Further details of the modelling approach are provided under Assessment Methodology and Section 8 of the TA.
OUD Stakeholder Workshops and Public Consultations (July 2022, November 2022, and March 2023)	
A series of stakeholder and community workshops were held by the Applicant to seek initial views from participants. This included local councils, residents, and other stakeholders. Some of the key issues from a transport perspective were: ▪ Concerns regarding the closure of Sandy Lane and the impact on the	Network Rail is currently proposing that the Yarnton Lane level crossing is to be replaced with a pedestrian bridge and the Sandy Lane level crossing is to be replaced with a ramped cycle/pedestrian bridge. These proposals will be subject to a separate application(s), expected to be submitted in Autumn 2023 by Network Rail.

Consultee and Comment	Response
highway network and reduced accessibility. ▪ The need to maintain / improved public walking and cycling routes. ▪ Traffic and the need for safe crossings across roads. ▪ Concerns over traffic congestion, particularly on the A44 link. ▪ Concerns more buses will be stationary on the A44.	Based on the feedback from the Begbroke Innovation District public consultation, OUD is currently working with Network Rail to prepare an alternative design for a bridge over the railway that could accommodate cyclists, pedestrians and public transport vehicles. Neither the Network Rail cycle/pedestrian bridge nor the alternative bridge design are part of the Proposed Development for which planning permission is being sought. However, given that Sandy Lane is to be closed to vehicular traffic within Partial Review Local Plan policy and that Network Rail's application for the closure of the level crossing is imminent, the traffic modelling, which forms the basis for the assessment in this chapter, includes the closure of Sandy Lane to through vehicular traffic. This ES chapter assesses the impact of the Proposed Development on non-motorised and motorised users across the study area. It includes embedded transport mitigation, including walk and cycle routes and crossings and public transport improvements. The A44 is included in the assessment study area in all scenarios. Bus priority measures are proposed as part of the embedded transport mitigation.

EIA Scoping Opinion

9.3.3 A request for a Scoping Opinion was submitted by the Applicant to CDC on 9th December 2022. An EIA Scoping Report accompanied the request (Appendix 3.2). An EIA Scoping Opinion was issued by the CDC on 27th January 2023 (Appendix 3.3) which included comments from statutory consultees. Table 9.2 summarises key comments raised by consultees of relevance to this assessment by the EIA Scoping Opinion and how the assessment has responded to them.

Table 9.2: EIA Scoping Opinion Response

Consultee and Comment	Response
OCC (January 2023)	
The ES transport chapter should assess the effect of the Proposed Development in line with the IEMA guidelines.	This chapter provides the assessment in line with IEMA guidelines.

Consultee and Comment	Response
Refer to safeguard of land for railway station rather than rail halt and whilst a railway station will not form part of the application, the EIA will need to address how the railway station could be incorporated into the Proposed Development in the future.	Policy PR8 of the Local Plan requires that land be reserved for a *"railway halt/station"* within the masterplan and the TA sets out how a potential railway halt or station would be incorporated into the Proposed Development and associated transport infrastructure.
Additional signalised pedestrian crossings over the A44 will be required to enable east – west connections. Planning for pedestrian and cycle routes must have regard for the Kidlington LCWIP. A new pedestrian, cycle and wheelchair accessible bridge is also required over the Oxford Canal in order to provide an active travel connection between development sites PR8 and PR7b.	Appendix 4 of the Local Plan provides the infrastructure delivery plan (IDP) to be jointly funded by the PR sites. The IDP includes improvements to the A44 corridor for active travel and public transport including new pedestrian crossings.
The EIA will also be required to identify the environmental impacts of construction related activities and demonstrate that these can be appropriately mitigated, this will include the impacts of construction traffic on the local highway network. A Construction Traffic Management Plan will need to be agreed with the LPA prior to implementation of the development.	This EIA chapter has assessed the transport environmental impacts of construction associated with the Proposed Development. A Framework CTMP has been included in Appendix 9.3.
The introduction and implementation of a Controlled Parking Zone (CPZ), funded by the promoter of the site will also be required.	A CPZ will be implemented for the Proposed Development as part of the Transport Strategy and included within the TA.
National Highways (January 2023)	
National Highways do not offer a view on the scope of this ES chapter as it is for the LHA to determine. Notwithstanding, National Highways would expect the traffic impact on the A34 to be assessed.	Traffic modelling includes the A34 in the vicinity of the Site, including Peartree Interchange.
Network Rail (January 2023)	
Network Rail requires an assessment of the effect of future developments on the existing Sandy Lane and Yarnton Road level crossings given that the proposed Network Rail closure of the crossings is not yet consented.	Policy PR8 of the Cherwell Local Plan requires Sandy Lane to be closed to motorised traffic and therefore all 'with development' scenarios are on the basis of Sandy Lane being closed to motorised traffic.

Consultee and Comment	Response
CDC (27th January 2023)	
CDC requested the following aspects / developments to be considered in the cumulative assessment: ▪ The remaining parcels of the allocation (PR8) ▪ Oxford Airport Travel Hub ▪ Oxford Technology Park ▪ The operations of London Oxford Airport ▪ The potential re-location of Oxford United Football Club.	Remaining parcels of PR8 - Hallam Land is proposing to develop 300 dwellings on land that forms part of the PR8 allocation. Hallam Land's transport consultant has been working as part of the PR sites Transport Working Group, a group of PR site transport consultants, to assess the cumulative transport effects of the PR sites based on the North Oxford VISSIM model used to inform the TA. Early engagement has been held with Newcore, the landowner of another parcel of the PR8 allocated site, but the trips generated by the Newcore development have not been included in the VISSIM modelling as the final quantum of development and access strategy has not yet been confirmed. Oxford Airport Travel Hub is the proposed park and ride included in Appendix 4 of the Local Plan (infrastructure schedule)[4]. This has been included within the VISSIM model as part of mitigation for the PR sites. As agreed with OCC, Oxford Technology Park (CDC Ref: 21/03913/F) and Oxford Airport (CDC Ref: 20/03585/CLUP) have been included as committed developments as part of the 2033 Reference Case scenario for the traffic modelling. It is understood that Oxford United Football Club intends to relocate to land in the vicinity of Kidlington roundabout to the east of the Site. No information is in the public domain regarding the vehicle trips that are forecast to be generated by the proposed relocation of the football club. It has therefore not been included within the VISSIM modelling. Any application that comes forward by the football club in the future would need to consider the cumulative effects of the PR sites.
In the ES Scoping Note, paragraph 7.3 stated Sandy Lane and Yarnton Road are currently closed to all traffic.	This was stated in error. Sandy Lane and Yarnton Road have been referred to as currently open to all traffic in this ES Chapter.

Consultee and Comment	Response
In the ES Scoping Note, paragraph 7.37 stated Yarnton Level Crossing is currently closed to vehicles, however it is still open and used by vehicles.	This was stated in error. Yarnton level crossing has been referred to as currently open to all traffic in this ES Chapter.

Study Area

9.3.4 The study area covers the highway network to the north of Oxford including the A44, A4260, A34 and A40 corridors. The geographic extent of the traffic model to be used as the basis of the assessment has been agreed with OCC and is illustrated in Figure 9.1.

9.3.5 The study area shown in Figure 9.1 for the assessment of transport effects considered in this ES chapter has been defined based on the number and locations of roads and streets that are likely to be affected by the Proposed Development, and where there is potential for relevant receptors to be affected. The study area has been sub-divided into a series of road links, which form the basis of this assessment and are identified in Appendix 9.5.

Figure 9.1: Modelled Area Extracted from North of Oxford VISSIM micro-simulation model

9.3.6 Within the IEMA Guidelines, two broad rules are suggested that can be used as a screening process for the assessment:

- Rule 1: include highway links where traffic flows would increase by more than 30% (or the number of HGVs would increase by more than 30%).
- Rule 2: include any other specifically sensitive areas (where sensitivity is defined as 'high' based on the criteria in Tables 9.5 and 9.6) where traffic flows have increased by 10% or more.

9.3.7 The IEMA Guidelines is based on knowledge and experience of the environmental effects of traffic. The threshold of 30% has been set based on experience that imperceptible changes in the environmental effects of traffic are generally experienced when there is less than a 30% increase in traffic. Additionally, projected changes in total traffic flow of less than 10% create no discernible environmental effect, hence the second threshold as set out in Rule 2.

9.3.8 In accordance with the IEMA guidance, road links within the study area that do not meet the IEMA screening rules have been concluded to have a non-significant effect on transport and have been scoped out of further assessment.

Summary of Assessment Scope

9.3.9 This section provides an overview of the scope of the transport and access chapter of this ES.

Transport Effects

9.3.10 As outlined within the EIA Scoping Report and as agreed with OCC via the EIA Scoping Opinion, the scope of the assessment within this chapter is limited to the following assessment of effects:

- severance;
- pedestrian delay;
- pedestrian amenity;
- fear and intimidation;
- driver delay; and
- accidents and safety.

9.3.11 Noise and vibration effects are assessed in ES Chapter 10: Noise and Vibration of this ES. Dust and dirt from construction vehicles would be adequately mitigated through effective implementation of a Construction Environmental Management Plan (CEMP) and Framework Construction Traffic Management Plan (CTMP), which would be secured by planning condition. As such, dust and dirt effects from construction traffic on the local highway network are not assessed in this chapter, although dust trackout from construction vehicles is considered in ES Chapter 11: Air Quality. Impacts on designated habitats sites from road traffic associated with air quality and noise disturbance are assessed in ES Chapter 13: Ecology.

9.3.12 There are not envisaged to be hazardous loads associated with the construction of the Proposed Development, therefore this has been scoped out of this assessment. There may be additional hazardous loads associated with the operation phase of the Proposed Development. However, given this is an outline application, details and quantum of potential hazardous loads are unknown at this stage and have been scoped out of this assessment.

Any potential hazardous loads will be managed under standard procedures to ensure safe delivery and unloading.

9.3.13 Any abnormal loads associated with the construction stage of the Proposed Development would be dealt with under standard escorting and notification procedures and have not been considered further.

Establishing Baseline Conditions

9.3.14 The baseline year of the approved North Oxford VISSIM model provided by OCC is 2018, which was the year the traffic data was collected for the traffic model. Whilst the baseline model is based on traffic data that is 5 years old, a review of traffic trends has shown that there has not been growth in traffic in the study area over that period and indeed, traffic trends show a decline in traffic. Therefore, this is considered to be representative for use in this assessment.

9.3.15 The baseline transport conditions summarised in this chapter have been established through the following:

- The North Oxford VISSIM micro-simulation model has been used to establish the baseline highway conditions within the study area. This model has been validated and approved by OCC;
- A desktop review of the local geography, transport networks and public transport services in 2023;
- A desktop of personal injury collision (PIC) data in the vicinity of the Proposed Development, sourced from OCC and CrashMap data for a 5 year period from 01/01/2018 – 16/04/2023, which is the latest complete five years, and also includes the latest 2023 provisional data.
- A series of site visits undertaken in 2022 and 2023 to review the surrounding walking and cycling environment, public rights of way, public transport services and facilities and traffic conditions;
- A review of the 2011 Census data for Cherwell; and
- Engagement with OCC as the local highway authority.

Identifying and Assessing Likely Significant Effects

Assessment Scenarios

9.3.16 The assessment summarised within this chapter has considered the following scenarios which incorporate a baseline situation and future year scenarios, to consider the effects of the Proposed Development on the local highway network, in both the construction and operation phase and the cumulative effects of the PR sites (as defined as site allocations in the Local Plan) when the sites are all built out and operational. Peak construction of the Proposed Development is expected to occur in 2028 and all of the PR sites are expected to be completed by 2033. 2028 and 2033 therefore reflect the future years for this assessment and the approach to background traffic growth is summarised in Appendix J of the TA.

9.3.17 The assessment has been informed by that approach undertaken as part of the TA which has been consulted on and agreed with OCC. The approach to forecasting the trip generation for the Proposed Development, approach to traffic growth and committed

development, and approach to modelling is set out in Sections 7 and 8 of the TA. Table 9.3 summarises the assessment scenarios included within this ES chapter.

Table 9.3: Summary of Assessment Scenarios

Scenario	Base Traffic	Traffic			Infrastructure				
		Committed development[ii]	Other PR sites	Proposed Development	Proposed Development access changes	OCC Growth fund works	Sandy Lane Closure	Local Plan Infrastructure (Appendix 4 IDP)	Mode Shift Background Traffic
2018 Base	✓								None
2033: Reference Case (Sandy Lane closed)	✓	✓				✓	✓		
2033: Proposed Development	✓	✓		✓	✓	✓	✓	✓	✓ (Medium)
2033: Proposed Development + PR Sites	✓	✓	✓	✓	✓	✓	✓	✓	✓ (Medium)
2028 Reference Case + Proposed Development Construction Traffic	✓	✓		Construction	Construction	✓	✓		

[ii] A complete list of committed developments and committed transport infrastructure included in the 2033 Reference Case are outlined in the Forecasting Report included as Appendix J of the TA.

Future Year Baseline

9.3.18 As part of Oxford Phase 2[11], Network Rail is proposing to close Yarnton Lane and Sandy Lane level crossings. Given that the policy within the Local Plan requires Sandy Lane to be closed to through traffic as part of the PR8 allocation, Network Rail is proposing to replace the level crossings with footbridges. Given that Sandy Lane is to be closed to vehicular traffic within Local Plan policy and that Network Rail's application for the closure of the level crossing is imminent, the traffic modelling, which forms the basis for the assessment in this chapter, includes the closure of Sandy Lane to through vehicular traffic as part of the 2033 Reference Case.

Construction

9.3.19 This chapter includes an assessment of the transport effects during the construction phase of the Proposed Development when there will be HGVs entering / exiting the Site as well as the construction workforce. The following construction phase scenario has been assessed:

- 2028 Reference Case (Sandy Lane closed) + construction of Proposed Development.

9.3.20 This scenario is considered analogous to the peak construction year, assumed to be 2028 for the Proposed Development, as background traffic growth has been assumed to be 0% based on analysis of historic traffic trends, OCC transport targets and discussions with OCC as set out in Appendix J of the TA.

9.3.21 Given that Network Rail is currently progressing an application to close the level crossings to traffic and that the Local Plan policy requires Sandy Lane to be closed for walk and cycle use only, it is considered reasonable to assume that Sandy Lane will be closed to traffic during peak construction of the Proposed Development and it has been assessed on this basis.

9.3.22 The assumptions and limitations section of this chapter sets out the limitations to the 2028 Reference + construction of Proposed Development scenario for transport, air quality and noise assessments.

Completed Development

9.3.23 This chapter includes an assessment of the transport effects once the Proposed Development has been completed and is fully occupied. Committed development and committed infrastructure is included in the 2033 Reference Case.

9.3.24 The following scenario has been assessed for the Completed Development:

- 2033 Reference (Sandy Lane closed) + Proposed Development.

9.3.25 The policy position in the Local Plan is for Sandy Lane to be closed to general traffic as part of the PR8 allocation. Therefore, once development comes forward at PR8, Sandy Lane would be required to be closed to general traffic in order to be compliant with policy. Therefore, all scenarios that include development at PR8 have been assessed with Sandy Lane closed to through vehicular traffic.

9.3.26 Embedded mitigation for the Proposed Development includes walk, cycle and public transport infrastructure within the Site, a mobility hub within the Local Centre, new and improved bus services and a package of off-site infrastructure improvements summarised in Appendix 4 of the Local Plan.

Cumulative Assessment

9.3.27 The following scenario has been assessed for the cumulative assessment of the Completed Development:

- 2033 Reference (Sandy Lane closed) + Proposed Development + PR sites.

9.3.28 The traffic modelling has been progressed and discussed with OCC over a number of years as part of the pre-application stage and cumulative developments were agreed with OCC for inclusion in the modelling, which were considered at the time of model development to have a reasonable degree of certainty of proceeding in the short term in accordance with Planning Policy Guidance.

9.3.29 Table 9.4 summarises the cumulative schemes considered in the ES and if they have been included as part of the 2033 Reference Case, cumulative scenario or scoped out of the assessment.

Table 9.4: Schedule of Cumulative Schemes

No.	LPA Ref. No.	Site Allocation / Address	Residential Units	Sqm. Employment	Approx. Distance from Site Boundary	Scheme included in transport modelling
1	Oxford City Council 21/01449/FUL	Policy SP24 in Oxford Local Plan	134		2km east	Yes - included in 2033 Reference Case
2	Oxford City Council 20/03034/FUL	Policy SP25 in Oxford Local Plan	159		4km south east	No - not requested to be included by OCC due to distance from Site
3	Oxford City Council 21/01217/FUL	Policy SP26 in Oxford Local Plan	80		5km south east	No - not requested to be included by OCC due to distance from Site
4	Oxford City Council 21/02580/FUL	Policy SP23 in Oxford Local Plan	40		5km south east	No - not requested to be included by OCC due to distance from Site
5	Oxford City Council 18/02065/OUTFUL	Oxford North	480	87,300 sqm	2km south	Yes - included in 2033 Reference Case

No.	LPA Ref. No.	Site Allocation / Address	Residential Units	Sqm. Employment	Approx. Distance from Site Boundary	Scheme included in transport modelling
6	Cherwell District Council 14/02067/OUT	Oxford Technology Park		40,362 sqm	<1km north	Yes - included in 2033 Reference Case
7	Cherwell District Council 20/03585/CLUP	Oxford Airport		7,111 sqm	1.1km north	Yes - included in 2033 Reference Case
8	Cherwell District Council 22/00747/OUT	Policy PR7a	430		<1km east	Yes – included as a cumulative scheme
9	Cherwell District Council 21/00758/SCOP	Policy PR8 (Hallam Land)	300		0km	Yes – included as a cumulative scheme
10	Cherwell District Council 21/03522/OUT	Policy PR9	540		80m west	Yes – included as a cumulative scheme with associated transport infrastructure
11	West Oxfordshire District Council 22/02404/CC3REG	The dualling of 3.2km of the A40			2km south west	Yes
12	Cherwell District Council 22/01715/OUT	PR10	500		2km north west	Yes - included in 2033 Reference Case[3]
13	West Oxfordshire District Council 21/00189/FUL	Land East of Hill Rise, Woodstock	180		5km north west	Yes - included in 2033 Reference Case
14	West Oxfordshire District Council 21/00217/OUT	Policy EW5 - Land North of Banbury Road, Woodstock	235		4km north west	Yes - included in 2033 Reference Case
15	Cherwell District Council 22/01611/OUT	Policy PR7b	118		20m east	Yes – included as a cumulative scheme

[3] The VISSIM modelling was updated to reflect the PR10 proposals to align with the Scoping Opinion but just prior to the submission of the outline application for the Proposed Development, the PR10 outline application was withdrawn. It is considered that the traffic modelling that informs this chapter is a worst case assessment as it includes development trips associated with the now withdrawn PR10 application.

No.	LPA Ref. No.	Site Allocation / Address	Residential Units	Sqm. Employment	Approx. Distance from Site Boundary	Scheme included in transport modelling
16	Cherwell District Council 23/01233/OUT	Policy PR6a	800		<1km south east	Yes – included as a cumulative scheme
17	Cherwell District Council 22/03054/SO 23/00524/SO	Network Rail Closure of Sandy Lane and Yarnton Lane level crossings			Within Site	Yes – included in 2033 Reference Case
18	South Oxfordshire P22/S3420/SCO	Policy STRAT13	1,450		>6km south east	No – At time of undertaking the modelling no details were available on trip generation. An outline planning application has since been submitted (LPA Ref: P22/S4618/O) and the Transport Assessment that supports the application has considered the PR sites within the cumulative assessment.
19	West Oxfordshire District Council 20/01734/OUT	Eynsham Garden Village	2,200		4.9km south west	Yes - included in 2033 Reference Case
20	West Oxfordshire District Council 20/03379/OUT	Policy EW2 – allocated for 1,000 homes	180		6km south west	Yes - included in 2033 Reference Case
21	Cherwell District Council (no application)	Policy PR6c	N/A		5-6km south east	No – allocated as replacement golf course. No information available in

No.	LPA Ref. No.	Site Allocation / Address	Residential Units	Sqm. Employment	Approx. Distance from Site Boundary	Scheme included in transport modelling
						public domain and would generate low level of trips.
22	Cherwell District Council (no application)	CDC Policy PR6b	670		Within 1-2km south west	Yes – included as a cumulative scheme as part of PR site scenario
23	N/A	Policy SP52	130		5-6km south east	Not requested by OCC and no information available in public domain.
24	Cherwell District Council 22/00747/OUT	PR7a	96			Yes – included as a cumulative scheme
25	West Oxfordshire District Council 22/01330/OUT	Land North of Witney Road, Long Hanborough	150		5.8km west	No – not requested by OCC due to distance from Site.
26	Cherwell District Council 22/01682/F	Land North of Manor Farm, Noke		Solar Farm	5.2km east	No – not requested by OCC due to distance from Site.
27	Cherwell District Council 23/00517/F	Demolition of buildings and new Science Park, Oxford Airport		20,031 sqm	1.1km north	No – at the time of undertaking the traffic modelling no information was in the public domain. Consent was granted just before submission of the outline application for the Proposed Development.

No.	LPA Ref. No.	Site Allocation / Address	Residential Units	Sqm. Employment	Approx. Distance from Site Boundary	Scheme included in transport modelling
	Cherwell District Council 18/00803/OUT	Begbroke Science Park		12,500 sqm	Within the Site	Yes - included in 2033 Reference Case
	West Oxfordshire District Council 18/02574/RES	Policy EW3	254		3km north west	Yes - included in 2033 Reference Case
	Oxford City Council 13/01861/OUT	Wolvercote Paper Mill	190		2.3km south	Yes - included in 2033 Reference Case

Assessing Likely Significant Effects

9.3.30 The following methodologies and assumptions have been applied to assess the likely significant effects during the construction and operational phases of the Proposed Development and the cumulative assessment of the operational phase of the Proposed Development with the PR sites.

Severance

9.3.31 Severance is defined as the perceived division that can occur within a community when it becomes separated by a major traffic artery. It describes a series of factors that separate people from places and other people. Such division may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself.

9.3.32 The measurement and prediction of severance is difficult, but relevant factors include road width, traffic flow, speed, the presence of crossing facilities and the number of movements across the affected route.

9.3.33 IEMA Guidelines refer to the DfT's 'Manual of Environmental Appraisal', which suggests that changes in traffic flow of 30%, 60% and 90% would be likely to low, medium and high magnitude of impact on severance, respectively. Less than 30% increase in traffic flow is considered to be very low impact on severance.

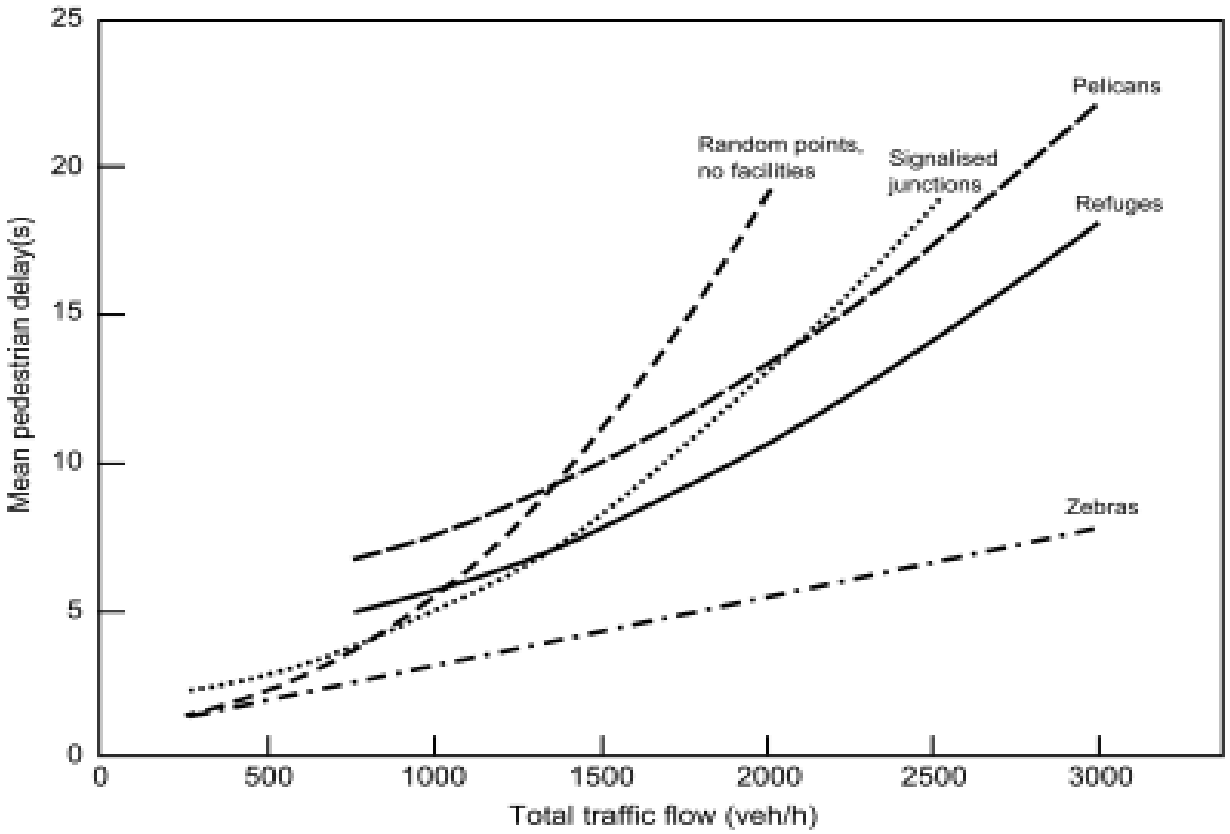
Pedestrian Delay

9.3.34 IEMA Guidelines note that changes in the volume, composition and/ or speed of traffic may affect the ability of people to cross roads. Typically, increases in traffic levels result in increased pedestrian delay, although increased pedestrian activity itself also contributes. The guidelines do not set any thresholds, recommending instead that assessors use their judgement to determine the significance of the impact.

9.3.35 The IEMA Guidelines refer to a report published by the Transport Research Laboratory ('TRL') (SR356)[12],as providing a useful approximation for determining pedestrian delay. The TRL research concluded that mean pedestrian delay was found to be 8 seconds at flows of 1,000 vehicles per hour and below 20 seconds at 2,000 vehicles per hour for various types of crossing conditions. This research provides predictive mean pedestrian delay based on

empirical data taking into account traffic flow and a range of parameters such as crossing width and vehicle speeds. The findings of the research are shown in Figure 9.2.

Figure 9.2: Mean pedestrian delays associated with different road crossing situations



9.3.36 A two-way flow of 1,400 vehicles per hour has been adopted as a lower threshold for assessment (equating to a mean 10 second delay for a link with no pedestrian facilities in the TRL report). Below this flow pedestrian delay is unlikely to be a significant factor and has been classified as very low impact. This is deemed a robust starting point for narrowing down the modelled routes within the study area and ensuring the routes selected exceeded the suggested threshold of analysis. It should be noted that for controlled forms of pedestrian crossing, the pedestrian delays are less.

Pedestrian Amenity

9.3.37 IEMA Guidelines define pedestrian amenity as the relative pleasantness of a journey. As with pedestrian delay, amenity is affected by traffic volumes and composition along with pavement width and pedestrian activity. The IEMA Guidelines considers that an effective threshold against which to assess the effect upon amenity is where traffic flow or HGV composition is halved or doubled. Below these levels the magnitude of impact is taken to be very low. The IEMA Guidelines require a judgement to be made on the magnitude of impact based on the routes with greater than 100 % change in traffic or HGV flow.

Fear and Intimidation

9.3.38 IEMA Guidelines note that a further impact traffic may have on pedestrians is fear and intimidation. The impact of this is dependent upon the volume of traffic, its HGV composition, its proximity to people or the lack of protection caused by factors such as narrow pavement widths.

9.3.39 In the absence of commonly agreed thresholds, the IEMA Guidelines provides a set of thresholds that could be used as an approximation of the likelihood of fear and intimidation.

Driver Delay

9.3.40 IEMA Guidelines note that driver delay can occur at several points on the network, although the effects are only likely to be significant when the traffic on the highway network is predicted to be at or close to the capacity of the system. An assessment of driver delay is provided in the TA based on the VISSIM modelling and summarised in this ES chapter.

Road Safety

9.3.41 IEMA Guidelines do not include any definition of significance in relation to accidents and safety, suggesting that professional judgement would be needed to assess the implications of local circumstance, or factors which may increase or decrease the risk of accidents.

9.3.42 There can be some small changes in prevailing road safety conditions arising simply as a result of having a greater number of journeys being made on a network; very simply, the more people that are travelling, the more people that may become involved in an accident. However, consideration needs to be given to other factors including changes in vehicle speed. For example, lower speed limits play a critical role in reducing the severity of collisions. The full results of the accident analysis are reported in the TA and are summarised in this ES chapter.

Determining Effect Significance

Sensitivity of Receptor

9.3.43 Receptors of potential effects associated with the Proposed Development can be people, wildlife, or elements of the natural and built environment. In the context of this chapter, receptors are considered to be users of the transport networks to whom the transport effects of the Proposed Development from its construction and operation would be perceptible.

9.3.44 These include:

- non-motorised users using the highway network (including pedestrians, cyclists, and equestrians); and
- drivers / passengers of motorised vehicles using the highway network.

9.3.45 Users of the canal (i.e. people travelling by canal boats) would also be sensitive receptors but they are not considered to be sensitive to an increase in traffic flows and are therefore scoped out of this assessment.

9.3.46 All receptors will exhibit a greater or lesser degree of sensitivity to the changes brought about by the Proposed Development. The sensitivity of a receptor is a function of its capacity to accommodate change. The details of the sensitivity of receptors is included Appendix 9.5.

9.3.47 The level of service criteria within the VISSIM modelling is specific for links and provides an indication of the capacity and delay experienced by drivers on each link. The criteria used to establish the sensitivity of links to driver delay is based on the VISSIM modelling level of service (LoS). LoS is a qualitative measure of the operation of a junction / highway based upon the traffic conditions, combining performing based measures such as delay and traffic

flows. Therefore, separate receptor sensitivity values have been applied to motorised and non-motorised users, with the criteria set out in Tables 9.5 and 9.6.

Table 9.5: Sensitivity of Receptors (Non-motorised Users) Criteria

Receptor Sensitivity	Receptor Type
High	High sensitive receptors (e.g. hospitals, schools, nurseries, nursing homes, a high concentration of residential dwellings and facilities and amenities, areas with high tourist footfall, significant pedestrian/cycle desire lines etc.) OR No / limited separation provided by the highway environment (e.g. no footway provision / cycle provision) in an area where there are significant pedestrian / cycle desire lines.
Medium	Medium sensitive receptors (e.g. medium concentration of residential dwellings and facilities and amenities, designated pedestrian/cycle desire lines including cycle routes and public footpaths). OR No / limited separation from traffic provided by the highway environment (e.g. narrow, intermittent footway provision close to carriageway, substandard pedestrian, and cycle provision) in an area where there are some pedestrian / cycle desire lines.
Low	Low sensitive receptors (e.g. small concentration of residential dwellings, facilities and amenities, few pedestrian / cycle desire lines etc) OR A highway environment that can accommodate changes in volume of traffic (e.g. adequate (i.e. to standard) footway provision / cycle provision, well separated provision from carriageway) with few pedestrian / cycle desire lines.
Very Low	No sensitive receptors (e.g. no residential dwellings, facilities and amenities and no pedestrian / desire lines etc) such as a rural area. OR A highway environment that can accommodate changes in volume of traffic (e.g. adequate (i.e. to standard) footway provision / cycle provision, well separated provision from carriageway) with no sensitive receptors (very low).

Table 9.6: Sensitivity of Receptors (Motorised Users) Criteria

Receptor sensitivity	Value
High	LoS above F
Medium	LoS score D – E
Low	LoS score B - C
Very Low	LoS score below A

9.3.48 Each link within the study area has been assigned to the nearest approach arm of an assessed junction within the VISSIM model. For links where no level of service data is

available, no sensitivity has been recorded and the sensitivity of driver delay is recorded as very low. The rationale for this approach is that junction modelling has only been reported for links where the Proposed Development is likely to have an effect on the performance of the highway network and driver delay.

9.3.49 The sensitivity of receptors to a change in road safety has been assessed by reference to the road traffic collision data. A baseline road safety assessment has been undertaken within Section 3 of the TA to establish clusters and any trends in collisions, including those involving vulnerable users. Links which have experienced a high level of collisions have been assigned higher sensitivity to road safety.

Magnitude of Impact

9.3.50 For those links that are not screened out of the assessment using Rules 1 and 2, the criteria set out in Table 9.7 has been used to determine the magnitude of impacts. However, the absolute level of an impact is also important (e.g. the total flow of traffic or HGVs on a link) and comment is made on this in the analysis. In addition, it is important to note that some impacts assessed are not permanent but are temporary and this affects the impact magnitude criteria attached to them.

Table 9.7: Magnitude of Impact Criteria

Impact	Magnitude of Impact			
	High	Medium	Low	Very Low
Severence	Change in total traffic of >90%	Change in total traffic of >=60 and <90%.	Change in total traffic of >=30 and <60%.	Change in total traffic of > 0 and <30%
Pedestrian delay	Pedestrian delay increases by >10 seconds (calculated by applying TRL 'pedestrian delay and traffic management' SR356	Pedestrian delay increases by >=5 and <= 10 seconds (calculated by applying TRL 'pedestrian delay and traffic management' SR356	Pedestrian delay increases by >2 and < 5 seconds (calculated by applying TRL 'pedestrian delay and traffic management' SR356	Change in two-way traffic of > 0 and <1,400 vehicles per hour OR pedestrian delay increases by >0 and <= 2 seconds (calculated by applying TRL 'pedestrian delay and traffic management' SR356
Amenity	Change in two-way traffic of >160% OR Change in HGV flows of >160%	Change in two-way traffic of >130% and <=160% OR Change in HGV flows of >130% and <=160%	Change in two-way traffic of >100% and <=130% OR Change in HGV flows of >100% and <=130%	Change in two-way traffic of >0 and <=100% OR Change in HGV flows of >0 and <=100%

Impact	Magnitude of Impact			
	High	Medium	Low	Very Low
Fear and intimidation	Change in 18hr average traffic flow of >=1,800 vehicles per hour Change in 18hr HGV flow of >=3,000 Change in average speed over 18 hrs +20 mph	Change in 18hr average traffic flow of >=1,200 and <1,800 vehicles per hour Change in 18hr HGV flow of >=2,000 and <3,000 Change in average speed over 18 hrs 15-20 mph	Change in 18hr average traffic flow of >=600 and <1,200 vehicles per hour Change in 18hr HGV flow of >=1,000 and <2,000 Change in average speed over 18 hrs 10-15 mph	Change in 18hr average traffic flow of >0 and <600 vehicles per hour Change in 18hr HGV flow of >0 and <1,000 Change in average speed over 18 hrs <10 mph
Driver Delay	A judgement based on analysis detailed in the Transport Assessment on increase in journey times.			
Accidents and Safety	A judgement based on analysis detailed in the Transport Assessment on collision history.			

Assessing Significance

9.3.51 The effect of the Proposed Development on transport is determined with due regard to the sensitivity of the receptor and magnitude of impact. The significance of effects matrix for transport effects are shown in Table 9.8.

Table 9.8: Classification and Significance of Effects

Sensitivity of receptor	Magnitude of Impact			
	High	Medium	Low	Very Low
High	Major	Major/ Moderate	Moderate	Minor
Medium	Major / Moderate	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible

9.3.52 Following the classification of an effect as presented in Table 9.6, a clear statement is made as to whether the effect is 'significant' or 'not significant'. As a general rule, major and moderate effects are considered to be significant and minor and negligible effects are considered to be not significant.

9.3.53 However, in accordance with the IEMA Guidelines, professional judgement is also applied where appropriate as well as consideration of absolute levels of traffic and the percentage

change in traffic. Paragraph 1.11 of the guidance states that *"the guidelines are intended to complement professional judgement and the experience of trained assessors" and goes on to state that "the experience and expertise of the assessor will remain of prime importance in conducting an environmental assessment."* The IEMA Guidelines also state at paragraph 4.2 that *"the assessment of impacts will need to determine both the change in magnitude of the impacts as well as their absolute levels".*

Assumptions and Limitations

9.3.54 The methodology for assessing the Proposed Development from a transport perspective relies upon the following key assumptions and limitations:

Future Baseline

9.3.55 The 2033 Reference Case scenario includes traffic generated by committed development agreed with OCC at the time of developing the traffic model (during 2021 and 2022) as well as an agreed approach to traffic growth. The 2033 Reference Case includes the traffic forecast to be generated by committed developments and proposed developments in Appendix 3.4 (i.e. cumulative scheme schedule). Where schemes are not assessed in the transport model, rationale is provided in Table 9.9. The details of the approach to committed and traffic growth are included in Appendices J and K of the TA.

Construction

9.3.56 Peak construction is expected to occur in 2028, however the VISSIM model is only available for the 2018 Baseline and 2033 Reference Case. There is no interim year VISSIM model available, nor was this requested by OCC.

9.3.57 As detailed in Appendix K of the TA, based on trends in historic traffic, it has been agreed with OCC that no background traffic growth is included in the traffic model. Therefore, the 2033 Reference Case would have the same background traffic were it to be a 2028 assessment year for the peak construction. The only difference would be the level of committed development and associated transport infrastructure that would be built out which cannot be realistically quantified with certainty. The 2033 Reference Case model has therefore been used as the basis of the 2028 construction phase assessment and is referred to as the 2028 Reference Case for the construction assessment.

9.3.58 The construction traffic flows have been manually assigned to the 2028 Reference Case network based on fixed HGV routes and construction workers based on Census distribution.

9.3.59 Construction traffic generation traffic has been based on forecast construction traffic for the consented Genome Campus expansion development in South Cambridgeshire (LPA ref: S/4329/18/OL) as the Genome Campus expansion quantum of development is similar to the Proposed Development. The quantum of development and nature of the project is similar to the Proposed Development and is considered to provide a reasonable basis for estimating the level of construction traffic. The construction traffic for the consented Genome Campus was derived by a contractor.

9.3.60 The assessment of construction effects only includes construction traffic forecast to be generated during the construction of the Proposed Development and does not include any traffic associated with the partial occupation of the Proposed Development during the construction phase. It is not known what level of development would be built out by that

stage and the trip generation associated with the partial completion of the development. The vehicular trips generated included in the Completed Development assessment are greater that the trips associated with the peak construction and partial completion of the Proposed Development and therefore the Completed Development assessment provides a worst case assessment of the transport effects.

9.3.61 The construction phase scenario only assesses the effect of the construction of the Proposed Development and does not consider the cumulative effects of the construction of the Proposed Development with the construction of other PR sites as the construction trajectories of the other PR sites are unknown.

Completed Development

9.3.62 A package of sustainable transport measures is proposed to be jointly funded by the PR sites. If only the Proposed Development comes forward, there would be less sustainable transport measures funded, which may affect the mode share of the Proposed Development (i.e. a lesser mode shift were the Proposed Development to be delivered without the other PR sites as a result of the reduced package of sustainable transport infrastructure). However, for the standalone assessment of the Proposed Development, the same trip rates have been applied to the development as for the cumulative assessment with the other allocated PR sites.

9.4 Baseline Conditions

9.4.1 An overview of the baseline conditions for the study area is provided in this section of the chapter. This includes a baseline for the pedestrian network, cycle network, Public Rights of Way (PRoWs), bus routes, the railway network, and the highway network. A detailed summary of the baseline conditions is provided in Section 3 of the TA.

9.4.2 The methodology to establish the existing baseline conditions of the study area is outlined in Section 9.3 of this ES Chapter.

Highway Network

9.4.3 The A44 passes with a north-south orientation immediately to the west of the Site. Several key routes intersect with the A44 close to Site. To the north, the A44 serves destinations in Oxfordshire that include Woodstock and Chipping Norton. To the south, the A44 meets the A4260 Frieze Way at Loop Farm roundabout and the A34 intersects the A44 at the grade-separated Pear Tree interchange. The A34 forms part of the strategic road network (SRN) and connects Oxford with the M40 and Bicester to the north-east and Abingdon and Didcot to the south. The A44 also intersects with the A40 at Wolvercote roundabout. The A40 provides connections to Whitney to the west and the M40 to the east. In addition to supporting more strategic connections, the A44 also provides points of access into the Site via Sandy Lane and Begbroke Hill.

9.4.4 Sandy Lane is a single carriageway passing through the Site that connects the A44 (to the west) with Yarnton Road and Kidlington (to the east). Within the Site, Sandy Lane intersects the Cherwell Valley railway line with level crossing infrastructure currently in place. Further east of the level crossing, Sandy Lane becomes Yarnton Lane and crosses the Oxford Canal into Kidlington via a single lane, signal-controlled bridge with a 3-tonne weight limit. To the south of the of Site, Yarnton Lane crosses the railway line with an existing level crossing. Both Sandy Lane and Yarnton Lane level crossings are currently open to vehicles.

9.4.5 Begbroke Hill is a single lane carriageway within the Site that connects Begbroke Science Park with the A44. It forms the eastern approach of a three-armed, signal-controlled junction with the A44. The existing Begbroke Science Park generates vehicle movements, including from employees, visitors, and deliveries/servicing. Trip generation for the existing Begbroke Science Park is based on baseline traffic surveys during a typical weekday and is included in the 2018 Base traffic model.

9.4.6 North of the Site, Langford Lane connects the A44 with the A4260 to the west and east, respectively. It provides direct access to Oxford Airport and Oxford Technology Park.

Collision History

9.4.7 Personal Injury Collision (PIC) data has been obtained from OCC and CrashMap for the 5 year period from 01/01/2018 to 16/04/2023.

9.4.8 Whilst all road traffic accidents are regrettable, a review of the PIC data gives no indication of specific concerns relating to the number, nature or pattern of PIC in the study area. Detailed analysis of the PIC data is included in Section 3 of the TA.

Walking Network

9.4.9 Key footway connections link the Site with existing amenities and services provided locally. Footways are provided along the radial routes of the A44 and A4260, which connect Oxford with Woodstock and Kidlington, respectively. Along most of their length, these pedestrian routes benefit from verge separation. However, in certain locations the route surfaces are of a relatively poor standard.

9.4.10 Limited east-west crossing opportunities are provided across the A44, which creates a barrier to pedestrian permeability between the Site and origins/destinations further west. A two-stage signalised crossing with dropped kerbs and tactile paving is provided across the northern arm of the existing A44 / Begbroke Hill junction and similar facilities are provided at the signalised A44 / Langford Lane junction. However, at all other junctions that fall within the study area along the A44 corridor, crossing facilities are limited to dropped kerbs that only occasionally include tactile paving.

9.4.11 No pedestrian facilities are provided along Sandy Lane, which takes the form of a narrow single carriageway road with a barrier-controlled level crossing. Further north, Begbroke Hill connects the A44 with the existing Begbroke Science Park and accommodates a shared footway/cycleway along its northern edge.

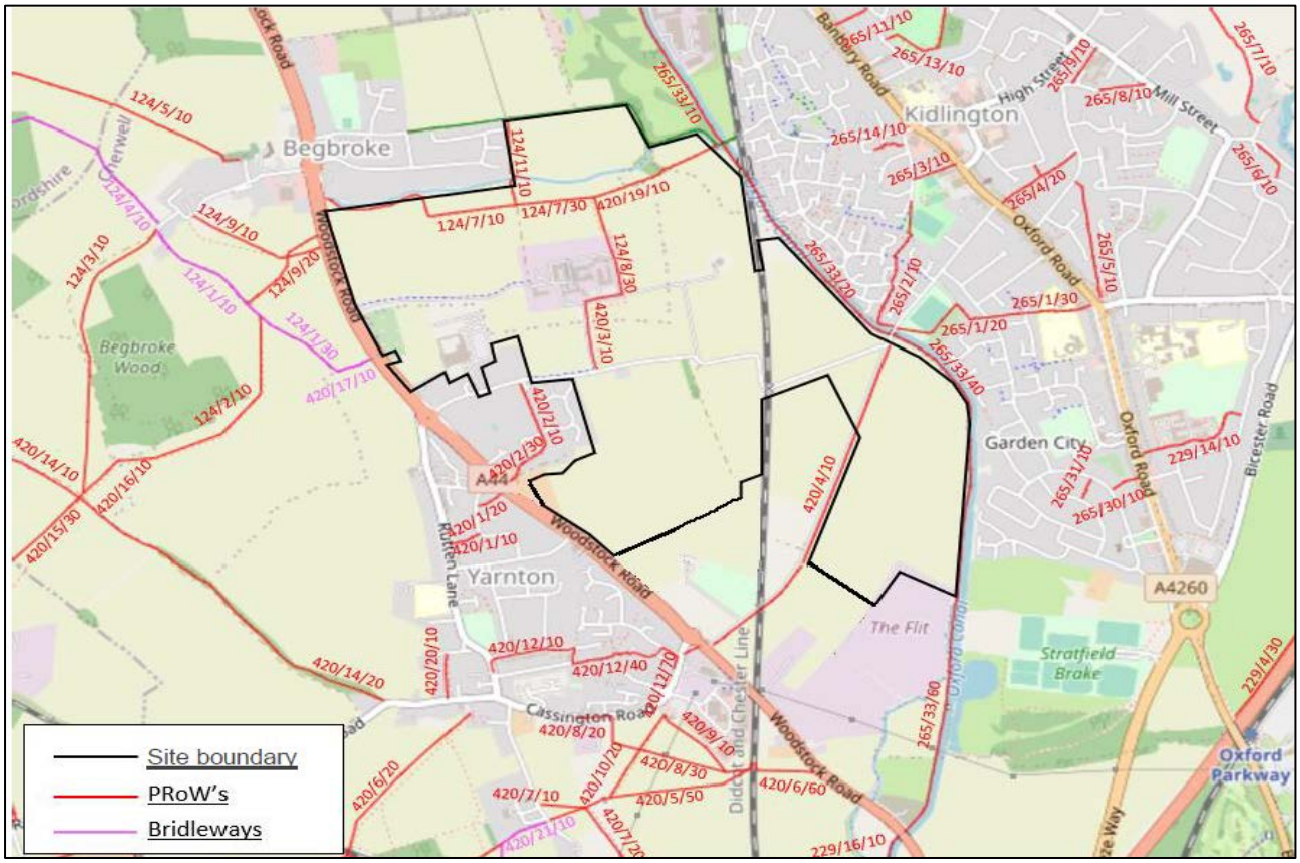
9.4.12 To the east of the Site, a canal towpath forms part of the ‘Green Belt Way’; a 50 miles circular route through the Oxford green belt.

Public Right of Way Network

9.4.13 A series of PRoW are located within the Site as shown on Figure 9.3. Immediately east of the existing Begbroke Science Park a PRoW follows a north-south orientation and connects Sandy Lane to the south with Rowel Brook to the north. Further PRoWs follow the general east-west alignment of Rowel Brook, in addition to crossing Rowel Brook and providing an onwards connection to Begbroke Lane, which is designated as a restricted byway. Additional PRoW are located along Yarnton Lane to the south of the Site between the A44 and the canal towpath, through the village of Yarnton, and around the perimeter of Begbroke

Wood to the west. The existing PRoW network is shown on Figure 9.3 alongside the indicative Site boundary.

Figure 9.3: Existing Public Rights of Way



9.4.14 In conjunction with the existing walking and cycle network, the existing PRoW network in the vicinity of the Site provides connectivity to Begbroke, Yarnton and Kidlington from the Site, as well as to the wider area.

Cycle Network

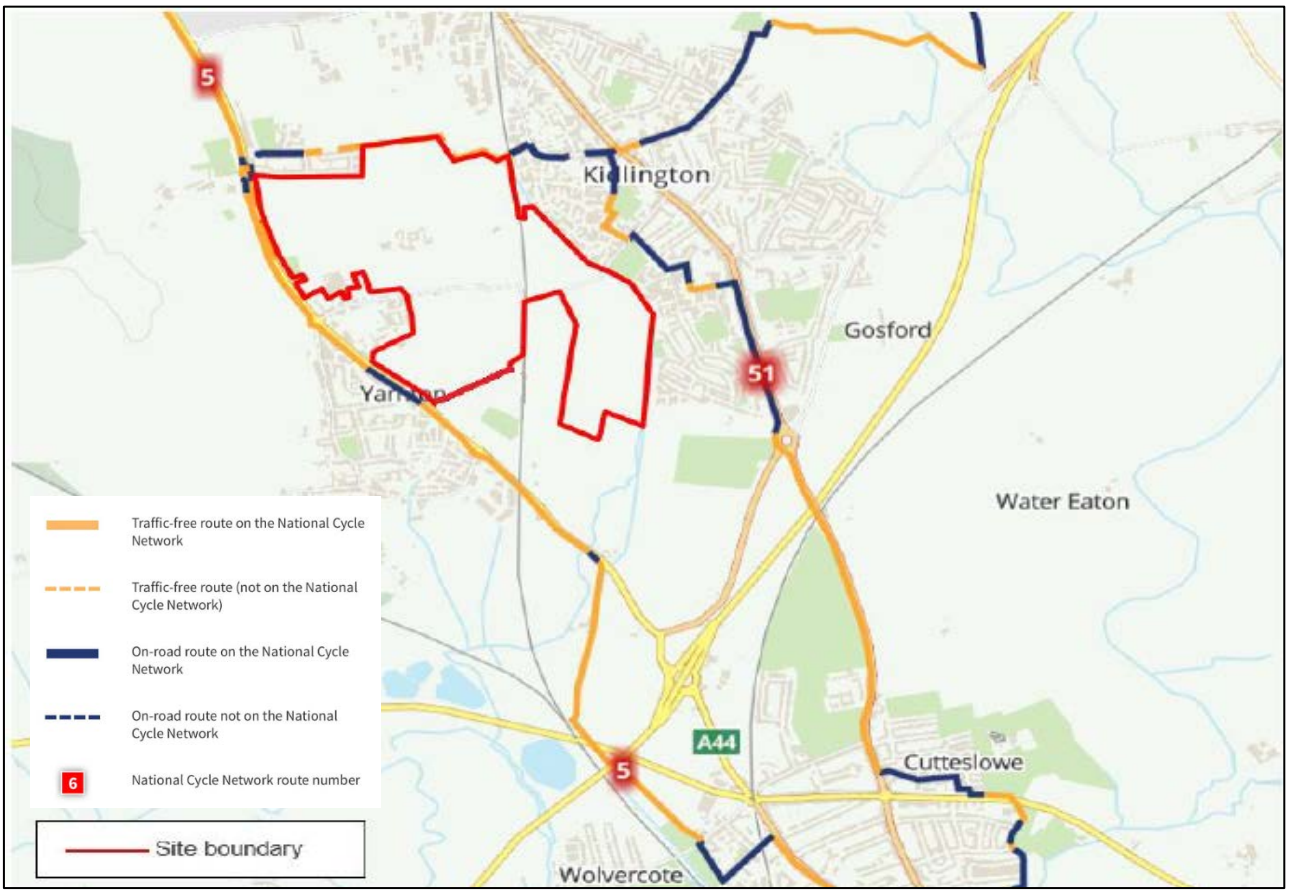
9.4.15 Within the vicinity of the Site, the A44 forms part of National Cycle Route (NCR) 5; a long-distance route that begins in Reading and follows the northern half of the Thames Valley cycle route as it crosses the Chiltern Hills on the way to Oxford and further west. Along the A44, NCR 5 accommodates traffic-free sections in both directions with shorter intervals of on-road route sections. Notwithstanding this, the traffic free sections are not currently in accordance with latest standards set out in LTN1/20 'Cycle Infrastructure Design'.

9.4.16 NCR 51 is another long-distance cycling route that begins in Oxford and routes to Bicester, Milton Keynes, and Bedford. Within the vicinity of the Site NCR 51 routes along Kidlington High Street, through residential streets to the west of A4260 before joining the A4260 and routing through Kidlington roundabout and along Oxford Road. It bypasses Cutteslowe roundabout and routes across a pedestrian/cycle bridge over the A40 and then through residential streets in Sunnymead and Summertown to access Oxford city centre, where the route terminates.

Towards the north east corner of Site, NCR 51 meets Begbroke Lane, highlighted previously as a designated byway that can be used by cyclists. Begbroke Lane is unlit with a gravel

surface passing through agricultural land on both sides. Figure 9.4 shows the national cycle network in the vicinity of Site.

Figure 9.4: Existing Cycle Network



9.4.17 The towpath of the Oxford Canal forms an important green transport corridor within Oxfordshire that is used by cyclists. The towpath along the Oxford Canal has been upgraded in phases. The first phase of the upgrade was undertaken in 2014 between Isis Lock by Rewley Road in Oxford city centre to Aristotle Lane. The Canal and River Trust in partnership with OCC has recently upgraded the section of towpath from Aristotle Lane to just north of the A44, immediately south-east of the Site and continuing south towards Oxford city centre.

Public Transport Network

9.4.18 The nearest bus service to the Site is the S3, which routes along the A44 between Chipping Norton and Oxford, via Yarnton village. This service has a 30-minute frequency from Monday to Saturday. The journey time is approximately 33 minutes from Begbroke village to Oxford city centre (Oxford railway station).

9.4.19 The Peartree Park and Ride facility is located at the Peartree Interchange (A44 / A34 junction) circa 2.3km south of the Site, which has 1,035 parking spaces and provides bus services to Oxford city centre 5 times per hour (i.e. 12 minute frequency).

9.4.20 Oxford Parkway railway station is located just over 6km to the south east of the Site, via A44 and Frieze Way. Oxford Parkway forms part of the Oxford-London Marylebone line via

Bicester. During weekday peak hours, services between Oxford Parkway and London Marylebone operate with a frequency of 2-3 direct trains per hour in each direction with a journey time of approximately 1 hr 10 mins.

9.4.21 There are three level crossings over the railway either within or just beyond the Site boundary. These are:

- Roundham Lock level crossing is location on the north-east boundary of the Site and provides public access across the railway between Partridge Place to the east and Restricted Byway Begbroke Lane to the west;
- Sandy Lane level crossing is located within the Site and provides vehicular access across the railway connecting the A44 and A4260 corridors; and
- Yarnton Lane level crossing is located just to the south of the Site and provides public access across the railway via a narrow single track lane (access only).

Baseline Traffic Flows

9.4.22 Analysis of baseline and historic traffic data sourced from OCC for the study area between 2000 and 2021 is provided in Appendix K of the TA. The analysis shows that there has been a reduction in traffic over during both the peak periods and over the course of the day.

9.4.23 The annual average weekday traffic flows (AAWT) derived from the 2018 VISSIM base model flows are summarised in Table 9.9 for key roads within the study area.

Table 9.9: 2018 AAWT baseline traffic flows (two-way vehicles)

Road	18 hour AAWT (two-way vehicles)
A44 north of Langford Lane	23,809
Langford Lane	12,456
A44 south of Langford Lane	24,427
A44 south of Begbroke Science Park	24,871
A44 south of Cassington roundabout	26,304
A44 south of Loop Farm roundabout	32,189
Sandy Lane	2,750
Frieze Way	13,589
A4260 Banbury Road south of Langford Lane	15,030
A4260 Oxford Road north of Kidlington roundabout	17,505
Oxford Road, south of Oxford Parkway	16,991

Future Baseline

Committed Development

9.4.24 As agreed with OCC, the North Oxford VISSIM model was used to assess the cumulative impact of development-generated traffic from the PR sites on the operation of the highway network. The Zone of Influence for the assessment included in this ES chapter has been based on the study area included within the North Oxford VISSIM model.

9.4.25 The 2033 Reference Case VISSIM model (i.e. the future baseline) includes a number of committed developments, which have been agreed with OCC. The PR sites are not included in the 2033 Reference Case as they do not have planning consent and have the same status as the Proposed Development. The PR sites are instead assessed as part of the cumulative assessment to determine the in-combination effects with all of the PR sites (see paras. 9.3.27 – 9.3.29).

Committed Transport Infrastructure

9.4.26 Details of the future year transport conditions are detailed in Section 4 of the TA.

9.4.27 The rail infrastructure at Oxford railway station is close to full capacity and would currently be unable to accommodate the increase in demand for services. To increase capacity, 'Oxford Corridor Phase 2' is currently being implemented by Network Rail and propose a number of improvements by 2024, including:

- New platform at Oxford railway station with improved passenger facilities;
- New secondary station entrance at Oxford railway station on the western side of the railway to improve accessibility and passenger experience;
- Closure of level crossings at Yarnton Lane and Sandy Lane, as well as creation of three high-speed crossovers at Oxford North Junction. These proposed level crossing closures would provide capacity for an additional two freight trains per hour between Birmingham and Oxford on the Cherwell Valley Railway Line, as well as increased maintenance access and safety improvements.

9.4.28 The Yarnton Lane and Sandy Lane level crossings are proposed to be replaced by Network Rail bridges, subject to the necessary consents. The Yarnton Lane level crossing is proposed to be replaced with a stepped only pedestrian footbridge by Network Rail and the Sandy Lane level crossing is proposed to be replaced with a ramped footbridge, suitable for pedestrians and cyclists. Given that Sandy Lane is to be closed to vehicular traffic within Local Plan policy and that Network Rail's application for the closure of the level crossing is imminent, the traffic modelling, which forms the basis for the assessment in this chapter includes the closure of Sandy Lane to through vehicular traffic.

9.4.29 Other committed infrastructure improvements that are included in the 2033 Reference Case VISSIM model, forming part of the future baseline scenario, are:

- Improvements to Kidlington Roundabout for pedestrians and cyclists, including signal controlled crossings and improved routes circulating the roundabout;
- Improvements to the A44 between Peartree roundabout and Cassington roundabout focussed on bus priority and walk and cycle improvements;

- Improvements to A40 for sustainable travel including Eynsham 'park and ride', bus priority measures and walk and cycle improvements along the A40 between Eynsham and Oxford City; and
- Oxford North committed infrastructure improvements including sustainable transport improvements to the A44 in the vicinity of Oxford North as well as the internal link road that is connected at either end by two signalised junctions; one on the north side with A44 (Woodstock Road) and the other on the south side with the A40.

2033 Reference Case Traffic Flows

9.4.30 The AAWTs derived from the 2033 Reference Case VISSIM model flows are summarised in Table 9.10 for key roads within the study area.

Table 9.10: 2033 AAWT Reference Case traffic flows (two-way vehicles)

Road	2033 Reference Case 18 hour AAWT (two-way vehicles)
A44 north of Langford Lane	26,405
Langford Lane	15,043
A44 south of Langford Lane	27,975
A44 south of Begbroke Science Park	27,931
A44 south of Cassington roundabout	31,205
A44 south of Loop Farm roundabout	37,488
Sandy Lane	0
Frieze Way	14,532
A4260 Banbury Road south of Langford Lane	16,613
A4260 Oxford Road north of Kidlington roundabout	18,251
Oxford Road south of Oxford Parkway	17,046

Summary of Receptors and Sensitivity

9.4.31 Appendix 9.5 of this chapter summarises the sensitivity of the road links. The sensitivity of receptors for the 2033 assessment year has remained the same as for the 2018 baseline year.

9.5 Embedded Mitigation (Scheme Design and Management)

9.5.1 This section provides a summary of the embedded mitigation and management measures inherent within the Proposed Development which relate to transport and access.

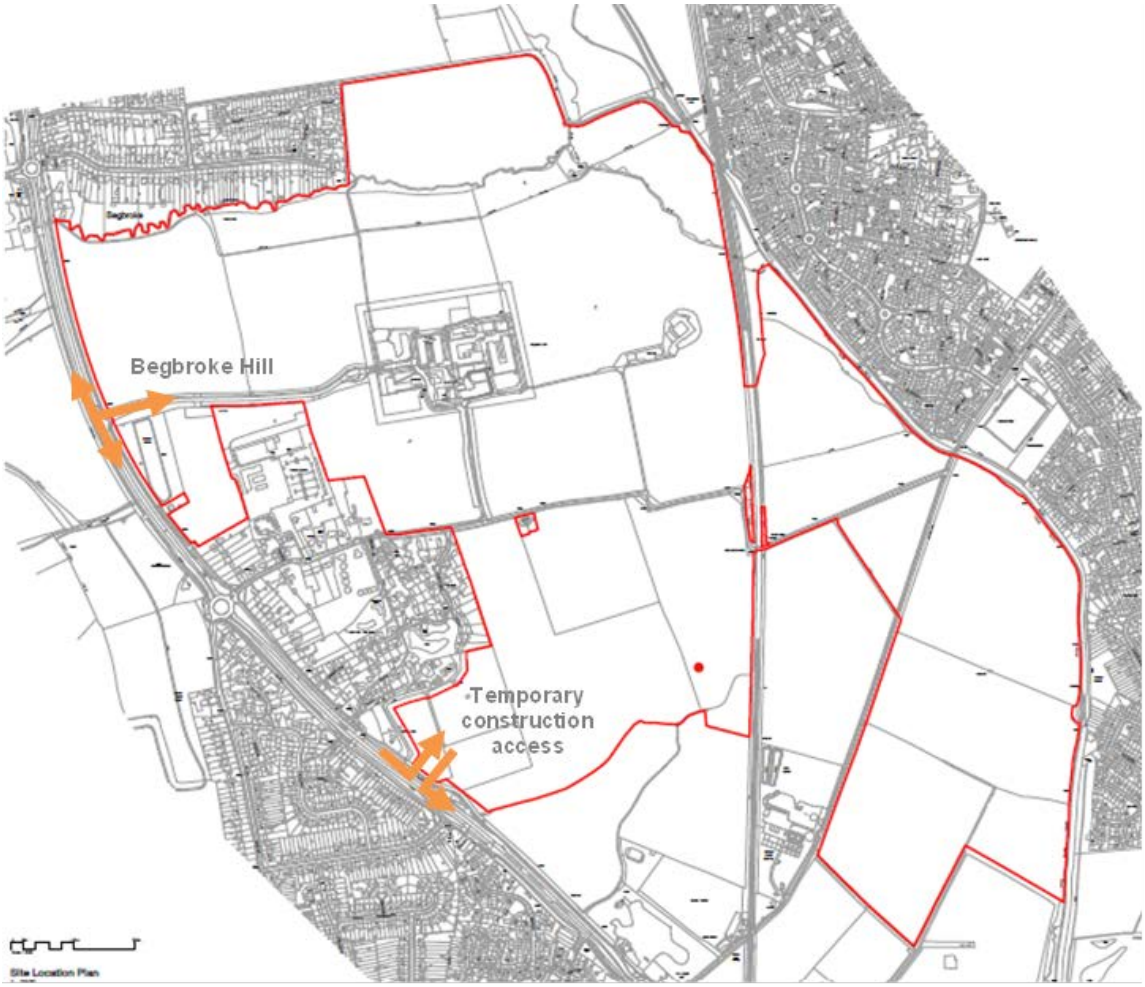
Construction

9.5.2 Measures will be undertaken during the construction phase in order to minimise disruption and manage the impacts of the Proposed Development, as outlined below.

Construction Access

9.5.3 Construction access is proposed to principally be taken from the existing Begbroke Hill access with the A44. In addition, a temporary access onto the A44 from the Site boundary is proposed to provide temporary construction access to the southern part of the Site. This will enable construction vehicles to be managed along the A44 and within the Site. No access will be from Sandy Lane. Figure 9.5 illustrates the proposed construction access arrangements.

Figure 9.5: Proposed Construction Access Arrangements



Construction Traffic Management

9.5.4 A Framework CTMP has been prepared in support of the outline planning application (see Appendix 9.3) to minimise disturbance which could potentially arise from traffic generated by the Proposed Development and would be secured by planning condition. The key elements of the Framework CTMP include:

- Routing traffic to the Site in order to maintain heavy construction traffic on the SRN so far as possible and thereby minimise the impact of construction traffic on local communities;
- Signage to identify access routes and to inform motorists that the local roads are accommodating construction traffic;
- Scheduling of construction traffic movements (equipment and materials), when possible, to avoid the peak traffic periods at the beginning and end of each working day and other sensitive periods, in order to minimise potential disturbance to local residents, users or visitors at BSP, or safety impacts at junctions;
- Ensuring PRoWs are maintained open and, where a temporary closure is required, an appropriate diversion is provided;
- Wheel cleaning on-site to keep the local highway clear of mud and debris;
- Implementation of driver rules; and
- The principal contractor would liaise with stakeholders prior to commencing construction of the Proposed Development and throughout work on-site.

Completed Development

9.5.5 The following embedded design measures represent primary mitigation of relevance to the completed Proposed Development and incorporated into the transport modelling, where applicable.

Sustainable Community

9.5.6 The Proposed Development will reduce private motorised travel through an integrated settlement pattern with a mix of housing, jobs, education and supporting community uses. Strategic scale development of this size has significant advantages in transport terms. Achieving a critical mass of people means that services, facilities and leisure opportunities can be provided on site meaning a significant amount of travel will occur only within the Site itself. Likewise, the proposed mix of housing and jobs provides the opportunity for people to live and work within walking distance.

Access

9.5.7 The Proposed Development will be served by two points of access that connect with the A44, the indicative location of which is included within the Access and Movement Parameter Plan (see Appendix 5.1). In the north, the existing Begbroke Hill access will be upgraded by PR9 to include access to the allocated PR9 site, across the A44, via a fourth arm that connects with the signalised junction to the west. Improvements to pedestrian and cycle crossing facilities are proposed at the junction.

9.5.8 A second access is proposed as a new three arm signalised junction connecting with the A44, which would be provided within land owned by Hallam Land to the south, which forms part of the PR8 allocation.

9.5.9 These two access points will separately serve the northern and southern portions of the Proposed Development with no through connection provided for general traffic. Instead, a north-south restricted access will be provided for accommodating pedestrians, cyclists, public transport, and servicing vehicles.

9.5.10 The roads within the Proposed Development will promote a low car mode share, where the principle of 'living streets' is applied. Further details are set out in the Strategic Design Guidelines (Appendix 5.3).

Mobility Hubs

9.5.11 A mobility hub is proposed to be delivered by OCC on land at Oxford Airport, through joint funding from the PR sites and other committed developments secured through S106 Agreements. The purpose of the Oxford airport mobility hub would be to intersect vehicle trips on the A44 and transfer drivers to sustainable modes of travel, including bus and active travel. Appendix L of the TA sets out how the mobility hub at Oxford Airport has been incorporated into the VISSIM modelling.

9.5.12 A mobility hub is also proposed within the Proposed Development, in the vicinity of the Local Centre, the details of which will be agreed with OCC by condition. It is envisaged that the mobility hub would include bus stops, cycle parking, EV charging spaces and car club spaces. By clustering transport facilities, mobility hubs seek to provide, facilitate, and encourage multi-modal transport use to and from the Proposed Development.

Public Transport

9.5.13 A range of new and improved public transport networks are to be jointly funded by the PR sites:

- The existing bus route S3 is proposed to increase in frequency to four buses per hour in each direction, with the route running straight along the A44 and not through Yarnton;
- A new bus route is proposed to be introduced, which would route through the Proposed Development and Yarnton before routing along the A44 to Loop Farm roundabout and then along Frieze Way to Oxford Parkway and onwards into Oxford; and

9.5.14 In addition, as part of the Proposed Development, a community bus service will be funded by OUD between Yarnton, the Proposed Development and Kidlington. Currently, no service operates on this route.

9.5.15 New bus stops would be provided within the Site, approximately 400m apart along the bus route.

9.5.16 Appendix L of the TA sets out how improvements to bus services have been incorporated into the VISSIM modelling.

9.5.17 The masterplan for the Proposed Development also contains safeguarded land for a potential railway halt or station. Should a railway station come forward in the future on land within the Proposed Development, it would be located on the Cherwell Valley Line, which runs between Didcot Parkway and Banbury via Oxford.

Walk and Cycle Network

9.5.18 The Proposed Development is built upon a strong foundation for pedestrian and cycling movement and connectivity. Active travel modes are prioritised. A range of high quality and permeable walk and cycle links are proposed, as illustrated in the Access and Movement Parameter Plan (see Appendix 5.1).

9.5.19 The design principles for the walking and cycling network within the Proposed Development include:

- Walking and cycle routes to connect the Proposed Development to the surrounding communities;
- Streets within the Proposed Development designed for low speeds;
- A network of car-free routes;
- Provision of a high-quality east-west active travel route through the Proposed Development along Sandy Lane connecting Yarnton to Kidlington;
- Provision of new pedestrian and cycle crossings on desire lines on the A44;
- Safeguarding land for provision of a walk / cycle bridge over the Oxford Canal to provide a route from the Proposed Development to Oxford Parkway.

9.5.20 Sustainable travel to and from the Site will be further encouraged through the Framework Site-Wide Travel Plan (see Appendix 9.2), which is to be secured by planning condition. This plan seeks to reduce the number of single occupancy vehicle trips and encourage users of the Proposed Development to achieve a modal shift away from private car journeys to active travel methods.

9.6 Assessment of Effects – Construction Phase

9.6.1 The detailed assessment of the construction phase is included in Appendix 9.6.

Construction Traffic

9.6.2 At peak construction it is forecast that there would be 1,050 construction workers (2,100 two-way worker movements per day) and 185 average daily HGV deliveries (370 two-way HGVs per day). The construction trip generation for the Proposed Development has been based on the consented Genome Campus development in South Cambridgeshire, which is a similar quantum and type of development to the Proposed Development. The construction trips for the consented Genome Campus development were derived by the appointed contractor.

9.6.3 The Sandy Lane closure is expected to be implemented by Network Rail prior to the peak construction period. On this basis, the effects of construction traffic have been assessed against the 2033 Reference Case (with Sandy Lane closed).

Rule 1 and 2 Screening

9.6.4 All links within the study area have been screened out of further assessment in terms of increase in total traffic.

9.6.5 All links within the study area have been screened out of further assessment in terms of increase in HGVs except for the following links:

- A44 Woodstock Road, near Begbroke Hill;
- A44 Woodstock Road, near Rutten Lane;
- A44 Woodstock Road, near Cassington Road; and
- A44 Woodstock Road, near Frieze Way.

Severance

9.6.6 All four links screened into the assessment in terms of increase in HGVs are within the vicinity of the proposed site access along the A44. Given that all construction traffic will need to access/egress the Site via the A44, each of these proximal links will experience an increase in construction-related HGV traffic. All links are considered low or very low sensitivity receptors. The percentage increase in terms of HGVs will range from 30-34% corresponding to a low magnitude of impact, which would result in a temporary, medium term negligible to minor adverse effect on severance, which is not significant.

Pedestrian Delay

9.6.7 The effect on pedestrian delay on the four links screened into the assessment as a result of the increase in HGVs during the construction phase would be negligible, which would be not significant.

Amenity

9.6.8 The effect on amenity on the four links screened into the assessment as a result of the increase in HGVs during the construction phase would be negligible, which would be not significant.

Fear and Intimidation

9.6.9 The effect on fear and intimidation on the four links screened into the assessment as a result of the increase in HGVs during the construction phase would be negligible, which would be not significant.

Driver Delay

9.6.10 The effect on driver delay on the links screened into the assessment as a result of the construction traffic would be temporary, medium term and minor adverse, which would be not significant.

Road Safety

9.6.11 The effect of the construction phase on road safety would be temporary, medium term and minor adverse, which would be not significant.

Mitigation, Monitoring and Residual Effects

9.6.12 No significant adverse effects have been identified from construction activities and no additional mitigation or monitoring is considered necessary. Residual effects remain as identified above.

9.7 Assessment of Effects - Completed Development

9.7.1 The detailed assessment of the Completed Development is included in Appendix 9.7.

Completed Development Traffic

9.7.2 The details of the multi-modal trip generation forecast to be generated by the Proposed Development are included in Section 7 of the TA.

9.7.3 The effects of the operational Proposed Development have been assessed against the 2033 Reference Case (with Sandy Lane closed).

9.7.4 Discussed in greater detail within the TA, it is expected that enhancements to the sustainable and active travel networks resulting from the delivery of the Proposed Development and the PR sites will result in wider mode shift across the study network. This mode shift has been incorporated in the assessment through adjustments to the modelled demands in the 'With Development' scenario to replicate the effects of changes in travel behaviour arising from these extensive sustainable travel improvements.

Rule 1 and 2 Screening

9.7.5 All links within the study area have been screened out of further assessment for the Completed Development except for the following links:

- Hamilton Road, north Oxford;
- First Turn, north Oxford; and
- Five Mile Drive, north Oxford.

Severance

9.7.6 First Turn is a high sensitivity receptor, Hamilton Road is a medium sensitivity and Five Mile Drive has a low sensitivity. Compared with the 2033 Reference Case, reductions in terms of total vehicles of -19%, -31% and -40% are reported on the respective links. As a result the significance of effect on severance would be minor beneficial, which would be not significant. Additionally, a reduction in terms of HGVs of 84% is reported on Five Mile Drive, which would a medium magnitude of impact on a low sensitivity link, which would result in a minor beneficial effect which is not significant.

Pedestrian Delay

9.7.7 The change in pedestrian delay on all three links screened into the assessment would be -0.01 seconds or less, resulting in a negligible effect on pedestrian delay, which would be not significant.

Amenity

9.7.8 The significance of effect on amenity on all three links screened into the assessment for both total vehicles and HGVs is considered to be either negligible or minor beneficial, which would be not significant.

Fear and Intimidation

9.7.9 The significance of effect on fear and intimidation on all three links screened into the assessment for both total vehicles and HGVs is considered to be either negligible or minor beneficial, which would be not significant.

Driver Delay

9.7.10 Details of the effects on driver delay are set out in Section 8 of the TA.

9.7.11 Comparison of the journey times of the 2033 Reference Case + Proposed Development with the 2033 Reference Case shows that in the AM peak hour (08:00-09:00) the change in journey time is forecast to be < 60 seconds for all journey time routes with the exception of:

- The A44 northbound between Staverton Road and PR8 access (Begbroke Hill) sees increases in journey time in the model of +48 to +292 seconds depending on the level of mode shift.
- The A44 northbound between PR8 access (Begbroke Hill) and Oxford Airport sees increases in journey time in the model of +39 to +191 seconds, depending on the level of mode shift.

9.7.12 In the PM peak hour (17:00-18:00) the journey times are forecast to increase by no more than 60 seconds for all routes with the 2033 Reference Case + Proposed Development compared to the 2033 Reference Case, with the exception of A44 southbound between Oxford Airport and the PR8 access (Begbroke Hill):

- The A44 southbound sees increases in journey time in the model of +230 to +281 seconds, depending on the level of mode shift.

9.7.13 There would also be journey time savings across the network in the AM and PM peak hours. As set out in Section 8 of the TA, the Proposed Development is forecast to result in changes to average delay of between -19 to +15 seconds per vehicle across the whole network during the network peak periods. Therefore, whilst there may be some localised changes (increases and decreases) in journey time on certain roads, across the study area as a whole the effect on driver delay would be minor adverse, which is not significant.

Road Safety

9.7.14 In addition to the delivery of the sustainable transport strategy for the Proposed Development, a package of off-site sustainable transport measures is proposed to be funded by the scheme, which will include improvements to walk and cycle infrastructure, new signal controlled pedestrian crossings over the A44 and improvements to bus services. These improvements are intended to promote a mode shift towards sustainable modes but they will also have road safety benefits by making it safer for vulnerable road users. Given this, the effect of the Proposed Development on road safety would be moderate beneficial, which would be significant.

Mitigation, Monitoring and Residual Effects

9.7.15 The OCC 'decide and provide' guidance requires a Monitoring and Evaluation Plan (MEP) to be secured and implemented through a Travel Plan as part of the S106 agreement.

9.7.16 The Proposed Development is committed to monitoring trips into and out of the Site over a number of years through the MEP, secured through the Framework Site Wide Travel Plan (see Appendix 9.3). The Framework Site Wide Travel Plan includes a Sustainable Transport Innovation Fund.

9.7.17 In accordance with the guidance, the MEP will record how the trip generation and mode share of the Proposed Development evolves over time.

9.7.18 Should the transport monitoring of the Proposed Development determine that the mode share targets are not being met, or on track to be met, remedial measures may be considered, which would be funded through the Sustainable Transport Innovation Fund.

9.8 Cumulative Effects – Completed Development

9.8.1 This section of the chapter summarises the assessment of the cumulative transport effects of the 2033 Reference Case + Proposed Development and the PR sites. The detailed assessment is included in Appendix 9.8.

Rule 1 and 2 Screening – Cumulative

9.8.2 For the cumulative assessment, all links within the study area have been screened out of further assessment through the transport modelling with the exception of the following links:

- Yarnton Road, Cassington;
- Yarnton Road, north of Cassington;
- Yarnton Road, west of Yarnton;
- Moreton Road, north Oxford;
- A4165 Banbury Road, north Oxford;
- A4144 Woodstock Road, north Oxford;
- A4144 Woodstock Road, near Wolvercote Roundabout;
- Five Mile Drive, north Oxford; and
- A44 south of Langford Lane; and
- A44 north of Begbroke Hill.

Severance

9.8.3 The assessment included in Appendix 9.8 shows the following effects on severance based on the change in total traffic:

- Yarnton Road, Cassington: minor beneficial
- Yarnton Road, north of Cassington: negligible
- Yarnton Road, west of Yarnton: negligible
- Moreton Road, north Oxford: minor beneficial
- A4165 Banbury Road, north Oxford: minor adverse
- Woodstock Road, Oxford: minor adverse
- Woodstock Road, Wolvercote: minor beneficial
- Five Mile Drive, north Oxford: negligible
- A44 south of Langford Lane negligible
- A44 north of Begbroke Hill negligible

9.8.4 The assessment included in Appendix 9.8 shows the following effects on severance based on the change in HGVs:

- Yarnton Road, Cassington: moderate beneficial
- Yarnton Road, north of Cassington: minor beneficial
- Yarnton Road, west of Yarnton: minor beneficial

- Moreton Road, north Oxford: minor beneficial
- A4165 Banbury Road, north Oxford: minor adverse
- Woodstock Road, Oxford: minor adverse
- Woodstock Road, Wolvercote: minor adverse
- Five Mile Drive, north Oxford: minor beneficial
- A44 south of Langford Lane minor adverse
- A44 north of Begbroke Hill negligible

9.8.5 The above effects on severance would be not significant, with the exception of Yarnton Road in Cassington, which is forecast to have a moderate beneficial effect on severance as a result of the change in HGVs, which would be significant.

Pedestrian Delay

9.8.6 The change in pedestrian delay on all links screened into the assessment would range between -2 seconds to +0.22 seconds, resulting in a very low magnitude of impact. For all links, the effect on pedestrian delay would range between minor adverse to minor beneficial, which would be not significant.

Amenity

9.8.7 For all links screened into the assessment, the effect on pedestrian amenity would range between minor adverse to minor beneficial, which would be not significant.

Fear and Intimidation

9.8.8 For all links screened into the assessment, the effect on fear and intimidation would range between minor adverse to minor beneficial, which would be not significant.

Driver Delay

9.8.9 Comparison of the journey times of the 2033 Reference Case + Proposed Development + PR sites with the 2033 Reference Case in the AM peak hour (08:00-09:00) show that the change in journey time is forecast to be < 60 seconds for all journey time routes with the exception of the following:

- The A44 northbound between Staverton Road and PR8/PR9 Access sees increases in journey time in the model of +94 to +212 seconds and the A44 southbound sees increases of +159 to +423 seconds, depending on level of mode shift.
- The A4260 northbound sees increases in the model in journey time of +37 to +99 seconds, depending on level of mode shift.
- There are also forecast to be some journey time savings on routes, most notably on the A4260 southbound (-270 to -336 seconds) and the A40 westbound (-113 to -271 seconds), depending on level of mode shift.

9.8.10 Comparison of the journey times of the 2033 Reference Case + Proposed Development + PR sites with the 2033 Reference Case in the PM peak hour (17:00-18:00) show that the change in journey time is forecast to be < 60 seconds for all journey time routes with the exception of the following:

- The A44 southbound between Staverton Road and PR8/PR9 access sees increases in journey time in the model of +731 to +800 seconds and the A44 southbound between Oxford Airport and PR8/PR9 Access sees increases of +34 to +78 seconds, depending on level of mode shift.
- A4260 southbound sees increases in journey time of +134 to +149 seconds and the A4260 northbound sees increases of +38 to +61 seconds, depending on level of mode shift.

9.8.11 The VISSIM modelling does not consider the full range of actions that people will take to minimise their inconvenience. For example, a moderate level of mode shift has been applied to the traffic model (range from 2.5 to 5% mode shift) but the modelling has not considered further mode shift that is likely to result from the implementation of OCC's LTCP in order to OCC to meet their mode shift target of 25% of car trips off the network by 2030. Likewise, the model does not consider other changes that people typically make to minimise inconvenience such as changing the time they travel (peak spreading or even travelling off peak) or using virtual mobility and not travelling (i.e. virtual meetings, online banking, online shopping etc). It is considered that these additional considerations would further reduce the effect on journey time.

9.8.12 As set out in Section 8 of the TA, the cumulative assessment is forecast to result in changes to average delay of between +7 to +63 seconds per vehicle across the whole network during the network peak periods. Therefore, whilst there may be some localised changes (increases and decreases) in journey time on certain roads, across the study area as a whole the effect on driver delay would be minor adverse, which is not significant.

9.8.13 The effect on bus journey times would be minor adverse which would be not significant, due to the presence of bus priority along the A44 and further bus priority planned to be implemented along the A44 to be funded by the PR sites and committed development.

Road Safety

9.8.14 In addition to the delivery of the sustainable transport strategy for the Site, a package of off-site sustainable transport measures is proposed to be jointly funded by the PR sites, which will include improvements to walk and cycle infrastructure, new signal controlled pedestrian crossings over the A44 and improvements to bus services and contribution towards a mobility hub at Oxford Airport. These improvements are intended to promote a mode shift towards sustainable modes but they will also have road safety benefits by making it safer for vulnerable road users. Given this, the cumulative effect of the Proposed Development and PR sites on road safety would be moderate beneficial, which would be significant.

Mitigation, Monitoring and Residual Effects

9.8.15 The same mitigation and monitoring as set out for the Proposed Development in isolation assessment applies to the cumulative assessment. The residual effects remain as stated above.

9.9 Summary

9.9.1 Table 9.11 below summarises the transport effects of the Proposed Development during construction and operation of the Proposed Development and cumulatively with other PR sites and other cumulative schemes once they are all completed.

Table 9.11: Summary of Effects

Effect	Receptor (Sensitivity)	Geographic & Temporal Scale	Magnitude of Impact	Significance of Effect	Additional Mitigation and Monitoring	Significance of Residual Effect
Construction						
Severance	A44 near Begbroke Hill A44 near Rutten Lane A44 near Cassington Road A44 near Frieze Way	Local, temporary	Low	Negligible to minor adverse	N/A	Negligible to minor adverse
Pedestrian delay	A44 near Begbroke Hill A44 near Rutten Lane A44 near Cassington Road A44 near Frieze Way	Local, temporary	Very low	Negligible	N/A	Negligible
Amenity	A44 near Begbroke Hill A44 near Rutten Lane A44 near Cassington Road A44 near Frieze Way	Local, temporary	Very low	Negligible	N/A	Negligible
Fear and intimidation	A44 near Begbroke Hill A44 near Rutten Lane A44 near Cassington Road A44 near Frieze Way	Local, temporary	Very low	Negligible	N/A	Negligible
Driver delay	All routes	Local, temporary	Low	Minor adverse	N/A	Minor adverse

Effect	Receptor (Sensitivity)	Geographic & Temporal Scale	Magnitude of Impact	Significance of Effect	Additional Mitigation and Monitoring	Significance of Residual Effect
Road safety	All routes	Local, temporary	Low	Minor adverse	N/A	Minor adverse
Completed Development						
Severance	Hamilton Road, north Oxford First Turn, north Oxford Five Mile Drive, north Oxford	Local, permanent	Low - Very low	Minor beneficial	N/A	Minor beneficial
Pedestrian delay	Hamilton Road, north Oxford First Turn, north Oxford Five Mile Drive, north Oxford	Local, permanent	Very low	Negligible – Minor beneficial	N/A	Negligible – Minor beneficial
Amenity	Hamilton Road, north Oxford First Turn, north Oxford Five Mile Drive, north Oxford	Local, permanent	Very low	Negligible – Minor beneficial	N/A	Negligible – Minor beneficial
Fear and Intimidation	Hamilton Road, north Oxford First Turn, north Oxford Five Mile Drive, north Oxford	Local, permanent	Very low	Negligible – Minor beneficial	N/A	Negligible – Minor beneficial
Driver delay	All routes	Local, permanent	Low	Minor adverse	Monitoring through Travel Plan and MEP	Minor adverse

Effect	Receptor (Sensitivity)	Geographic & Temporal Scale	Magnitude of Impact	Significance of Effect	Additional Mitigation and Monitoring	Significance of Residual Effect
					and Sustainable Transport Innovation Fund	
Road safety	All routes	Local, permanent	Medium	Moderate beneficial	N/A	Moderate beneficial
Completed Development + PR Sites						
Severance	Yarnton Rd, Cassington Yarnton Rd, north of Cassington Yarnton Road, west of Yarnton Moreton Road, north Oxford A4165 Banbury Road A4144 Woodstock Rd A4144 Woodstock Rd, near Wolvercote Roundabout Five Mile Drive, north Oxford A44 south of Langford Lane A44 north of Begbroke Hill	Local, permanent	Very low - low	Minor adverse – Negligible and Minor beneficial, for all links except Yarnton Road, Cassington which would have moderate beneficial effect	N/A	Minor adverse – Negligible and Minor beneficial, for all links except Yarnton Road, Cassington which would have moderate beneficial effect
Pedestrian delay	Yarnton Rd, Cassington Yarnton Rd, north of Cassington	Local, permanent	Very low	Minor adverse – Negligible and Minor beneficial	N/A	Minor adverse – Negligible and Minor beneficial

Effect	Receptor (Sensitivity)	Geographic & Temporal Scale	Magnitude of Impact	Significance of Effect	Additional Mitigation and Monitoring	Significance of Residual Effect
	Yarnton Road, west of Yarnton Moreton Road, north Oxford A4165 Banbury Road A4144 Woodstock Rd A4144 Woodstock Rd, near Wolvercote Roundabout Five Mile Drive, north Oxford A44 south of Langford Lane A44 north of Begbroke Hill					
Amenity	Yarnton Rd, Cassington Yarnton Rd, north of Cassington Yarnton Road, west of Yarnton Moreton Road, north Oxford A4165 Banbury Road A4144 Woodstock Rd A4144 Woodstock Rd, near Wolvercote Roundabout Five Mile Drive, north Oxford	Local, permanent	Very low	Minor adverse – Negligible and Minor beneficial	N/A	Minor adverse – Negligible and Minor beneficial

Effect	Receptor (Sensitivity)	Geographic & Temporal Scale	Magnitude of Impact	Significance of Effect	Additional Mitigation and Monitoring	Significance of Residual Effect
	A44 south of Langford Lane A44 north of Begbroke Hill					
Fear and intimidation	Yarnton Rd, Cassington Yarnton Rd, north of Cassington Yarnton Road, west of Yarnton Moreton Road, north Oxford A4165 Banbury Road Bell Lane, Cassington A4144 Woodstock Rd A4144 Woodstock Rd, near Wolvercote Roundabout Five Mile Drive, north Oxford	Local, permanent	Very low	Minor adverse – Negligible and Minor beneficial	N/A	Minor adverse – Negligible and Minor beneficial
Driver delay	All routes	Local, permanent	High	Minor adverse	Monitoring through Travel Plan and MEP and Sustainable Transport Innovation Fund	Minor adverse
Road safety	All routes	Local, permanent	Medium	Moderate beneficial	N/A	Moderate beneficial

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